REMARKS

Claims 1-25 are pending in this application. Claims 1-25 are rejected. No new matter has been added. It is respectfully submitted that the pending claims define allowable subject matter.

Claims 1, 3, 5, 6, 8, 10, 12, 14, 15, 17, 19, 20, 23 and 25 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 6,787,777 (Gagnon) in view of U.S. Patent 6,928,142 (Shao), and further in view of U.S. Patent No. 7,011,814 (Suddarth). Claims 2, 4, 7, 11, 13, 16, 21, 22, and 24 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Gagnon in view of Shao, further in view of Suddarth, and further in view of U.S. Patent No. 6,490,476 (Townsend). Claims 9 and 18 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Gagnon in view of Shao, further in view of Suddarth, and further in view of U.S. Patent No. 6,597,762 (Ferrant). Applicants respectfully traverse these rejections for at least the reasons set forth hereafter.

Independent claim 1 recites a method for analyzing at least one abnormality of an object, wherein the method includes, among other things, "correlating a relative metabolic activity to an abnormality based on a threshold value." For at least the reasons set forth below, Applicants submit that Suddarth does not describe or suggest correlating a relative metabolic activity from a second image to an abnormality in a first image based on a threshold value, as recited in claim 1; and therefore the combination of Gagnon, Shao, and Suddarth does not describe or suggest the method recited in claim 1.

Gagnon et al. describes a nuclear imaging system having a gamma camera divided into segments (abstract). In particular, each of two detector heads 32 and 34 is segmented into a plurality of regions such that only a portion of the field of view (FOV) is imaged during transmission scanning, emission scanning, or both. An optional detector head 35, when utilized, is configured in a like manner. The detector heads are segmented by (1) selectively enabling and disabling regions of the detector heads during successive emission and transmission scans and/or (2) employing in an emission imaging region of the detector a collimator suitable for emission imaging (i.e., restricting radiation received by the emission imaging region to radiation traveling

along a desired projection path, such as a parallel beam, a cone beam, fan beam collimator, etc.) and employing in a transmission imaging region an open frame crystal or a collimator or axial filter suitable for transmission imaging, such as a collimator or axial filter that matches the geometry of the transmission radiation source or for which the transmission source is substantially penetrating. In the preferred embodiments, the collimator is omitted for the transmission segments of the detectors and an open frame crystal is used. For example, a collimator is not required for a transmission radiation point or line source, or where the transmission radiation is collimated at the source (column 6, lines 5-27).

Gagnon et al. also describes that because transmission image data is structural or anatomical in nature, whereas emission image data is functional or metabolic in nature, it would be desirable to use transmission image data for image localization and/or image registration with a structural image of the same region from another imaging modality. The combination of a functional emission image with a structural transmission image or an image from another imaging modality can provide the diagnostician with insights that could not be obtained with either image alone, thus improving diagnostic accuracy. For example, in the area of oncology, precise positioning of localization of functional images enables a clinician to assess lesion progression and/or treatment effectiveness. Also, such diagnostic studies are used in surgical and/or radiotherapeutic planning, where precise positioning is necessary to minimize the effect on healthy cells surrounding the target cells (column 2, lines 33-49).

Shao et al. describes a method for plaque detection using a combined nuclear medicine and X-ray system (abstract). Using the combined system, a coordinate system 100 provides a framework to describe the positional relationship between the components of an imaging system 20 in response to position sensor signals, known geometric relationships between components and a subject 28, as well as operator input through control console input devices. For example, the operator may use a touch screen monitor 64 to highlight a selected ROI 40 of the subject 28 on an x-ray image displayed on the monitor 64. Once the ROI 40 is identified by the operator, the coordinate system provides the actual coordinates of the ROI 40 in the subject 28 within the examination space represented and defined by the coordinate system. The position of the ROI 40 identified and marked by the operator on the x-ray image is provided so that a nuclear camera head 50 can have a pinhole aperture 58 accurately positioned at the ROI 40 either manually or by

a nuclear camera position determination and control 104 and actuators 46b. In effect, the coordinate system 100 is used in determining the targeting coordinates in the real space of the imaging system 20 that are used to provide control signals to the position actuators 46b or assist the operator to manually locate the aperture 58 of the pinhole collimator 56 at the actual ROI 40 to be imaged in the subject 28 (column 7, lines 41-58).

Independent claim 1 recites a method for analyzing at least one abnormality of an object, wherein the method includes, among other things, "correlating a relative metabolic activity to an abnormality based on a threshold value." As admitted on page 3 of the outstanding Office Action, the combination of Gagnon and Shao fails to describe or suggest "correlation of relative metabolic activity with an abnormality based on a threshold value within the PET image." Rather, the combination of Gagnon and Shao describes correlating a measured metabolic activity to an abnormality based on a user defined region or registered images selected based on other anatomical factors. The Examiner asserts that Suddarth describes "analyzing metabolized glucose data by comparing the data to absolute threshold data established from population norms or to relative data either normal or tumor data taken on the subject previously", and that "it would have been obvious...to include the analyzation steps proposed by Suddarth in the system of Gagnon in order to determine whether tissue is malignant." (Page 3 of the outstanding Office Action).

Suddarth describes monitoring in vivo detected radiation in a target localized site within a subject, over a selected time period, to monitor or evaluate metabolic activity or evaluate a tumor prior to or after a therapeutic treatment. For example, Suddarth describes analyzing metabolized glucose data to assess when a tumor or site is aerobic (oxygen rich) or anaerobic (oxygen deficient). The presence of increased amounts of C-14 glucose during the biochemical process may be representative of a growing, aerobic, or active tumor. Such information may be able to be used to assess tumor receptiveness to a particular treatment such as a cytotoxic agent and/or to indicate that the target region comprises healthy tissue. Suddarth describes that the data may be analyzed by comparing the data to absolute threshold data established from population norms (which may be segmented by population age or gender or disorder) or to relative data either normal or tumor data taken on the subject previously.

However, Suddarth does not describe or suggest correlating a relative metabolic activity from a second image to an abnormality in a first image based on a threshold value, as recited in claim 1. Rather, Suddarth merely describes analyzing metabolic activity data by comparing the metabolic activity data to threshold data to monitor or evaluate the metabolic data or evaluate a tumor. Applicants submit that analyzing metabolic activity data using threshold data is not the same as correlating a relative metabolic activity from a second image to an abnormality in a first image based on a threshold value. Although both Suddarth and the method recited in claim 1 use threshold data, the threshold data is not the same. Namely, Suddarth uses threshold data that allows monitoring or evaluating metabolic data or evaluating a tumor using the metabolic data, while the method recited in claim 1 uses threshold data that allows a relative metabolic activity, from a second image, to be correlated to an abnormality in a first image.

Moreover, Applicants submit that there is no motivation to use the analyzation techniques described in Suddarth with the combination of Gagnon and Shao for correlation because such a combination already correlates a measured metabolic activity to an abnormality based on a user defined region or registered images selected based on other anatomical factors. Regardless, Applicants submit that the analyzation techniques described by Suddarth would not be helpful for the correlation of a metabolic activity with an abnormality for the reasons set forth above.

Accordingly, because Gagnon, Shao, and Suddarth each individually fail to describe or suggest one or more elements of independent claim 1, a combination of Gagnon, Shao, and Suddarth cannot describe or suggest such element(s). Independent claim 1 is therefore submitted to be patentable over Gagnon in view of Shao, and further in view of Suddarth.

Neither Townsend nor Ferrant, considered alone or in combination, make up for the deficiencies of the combination of Gagnon, Shao, and Suddarth with respect to claim 1.

Claims 2-9 depend from independent claim 1. When the recitations of claims 2-9 are considered in combination with the recitations of claim 1, Applicants submit that dependent claims 2-9 are likewise patentable over the cited art for at least the reasons set forth above with respect to claim 1.

Independents claim 10, 19, 20, and 25 are submitted to be patentable over the cited art for at least the reasons set forth above with respect to independent claim 1.

Claims 11-18 and 21-24 depend from independent claims 10 and 20, respectively. When the recitations of claims 11-18 and 21-24 are considered in combination with the recitations of respective claims 10 and 20, Applicants submit that dependent claims 11-18 and 21-24 are likewise patentable over the cited art for at least the reasons set forth above.

In view of the foregoing amendments and remarks, it is respectfully submitted that the prior art fails to teach or suggest the claimed invention and all of the pending claims in this application are believed to be in condition for allowance. Reconsideration and favorable action is respectfully solicited. Should anything remain in order to place the present application in condition for allowance, the Examiner is kindly invited to contact the undersigned at the telephone number listed below.

Respectfully submitted,

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